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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/059,865	04/14/1998	RAVI IYER		8997

7590 09/25/2002

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EXAMINER

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ART UNIT PAPER NUMBER

2813

DATE MAILED: 09/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAVI IYER

Appeal No. 2001-0336
Application No. 09/059,865

ON BRIEF

MAILED

SEP 25 2002

PAT. & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

Before FLEMING, LALL, and GROSS, ***Administrative Patent Judges.***

FLEMING, ***Administrative Patent Judge.***

DECISION ON APPEAL

This is a decision on appeal from the non-final rejection of claims 12-23, which have been twice rejected.

The invention relates to a method of manufacturing an integrated circuit (IC). The method includes the steps of forming features (601) on a substrate (100), the features protruding from the substrate to create creases adjacent the features, depositing a layer of non-dielectric material over the

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features and creases, removing a portion of the layer of the non-dielectric material, leaving undesirable residual non-dielectric material or stringers in some of the creases, and converting the undesirable non-dielectric material or stringers to a dielectric material. See Appellant's Specification, page 9, lines 2-5 and 27-30, page 13, lines 9-10 and 21-30, page 14, lines 11-12 and 28-31, and associated figures 6-8.

Claim 12 present in the application is reproduced as follows:

12. A method of manufacturing an integrated circuit, the method comprising the steps of:

- (a) forming features on a substrate, the features protruding from the substrate to create creases adjacent the features;
- (b) depositing a layer of non-dielectric material over the features and the creases;
- (c) removing a portion of the layer of non-dielectric material, leaving stringers of the non-dielectric material in the creases; and
- (d) converting the stringers of non-dielectric material in the creases into a dielectric material.

References

The references relied on by the Examiner are as follows:

Matsuoka et al. (Matsuoka)	5,391,508	Feb. 21, 1995
Kim	5,466,637	Nov. 14, 1995

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Iyer

5,872,052

Feb. 16, 1999
(filed Feb. 12, 1996)

Rejections at Issue

Claims 18-23 stand rejected under 35 U.S.C. § 112, 1st paragraph under the written description requirement, claims 12-23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kim and Matsuoka, and claims 12-23 stand rejected under the doctrine of double patenting over claims 1-22 of Iyer.

Rather than repeat the arguments of Appellant or the Examiner, we make reference to the Briefs¹ and the Answer for the respective details thereof.

OPINION

With full consideration being given the subject matter on appeal, the Examiner's rejections and the arguments of Appellant and Examiner, for the reasons stated *infra*, we reverse the Examiner's rejection of claims 18-23 under 35 U.S.C. § 112, 1st paragraph and affirm the Examiner's Rejection of claims 12-23 under 35 U.S.C. § 103 and claims 12-23 under the judicially created doctrine of non-statutory double patenting.

¹ Appellant filed an appeal brief on January 12, 2000, Paper No. 14. In response to the Examiner's Answer, Paper No. 15, mailed April 12, 2000, the Appellant filed a Reply Brief on June 15, 2000, Paper No. 16. The Examiner mailed an office communication on July 3, 2000, stating that the reply brief has been entered.

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***A. Rejection of claims 18-23 under 35 U.S.C. § 112,
first paragraph, written description requirement***

The Examiner has rejected claims 18-23 as containing subject matter which was not described in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the claimed invention at the time the application was filed. The Examiner argues that the original specification does not describe the subject matter of the "undesirable residual non-dielectric material" recited in claim 18, in such a way as to convey reasonably to one skilled in the art that the inventor had possession of the claimed invention. See Examiner's Answer, page 3, lines 7-13. The Examiner suggests that removal of the word, "undesirable," would result in a withdrawal of the rejection. See Examiner's Answer, page 3, line 13.

Appellant argues that the original specification does meet the written description requirement for the limitation, "undesirable residual non-dielectric material." For support, Appellant points to pages 13-14 of the specification, which describe the stringers as a residual non-dielectric material that is difficult to remove without damaging the protruding features and that causes gate leakage. See Appeal Brief, page 5, lines 6-20. Additionally, Appellant asserts that even the Examiner has

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described the stringers as undesirable residue that causes shorts with conductors. See Appeal Brief, page 6, lines 5-13.

The first paragraph of 35 U.S.C. § 112 requires that "the specification shall contain the written description of the invention[.]" 35 U.S.C. § 112, ¶ 1 (1994). This requires the Appellant to "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention." **Vas-Cath, Inc. v. Mahurkar**, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). "An Applicant complies with the written description requirement 'by describing the invention, with all its claimed limitations[.]' **Lockwood v. American Airlines, Inc.**, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). However, '[the applicant] does not have to describe exactly the subject matter claimed[.]'" **Vas-Cath, Inc. v. Mahurkar**, 935 F.2d at 1563, 19 USPQ2d at 1116, quoting **In re Gosteli**, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989).

Upon review of Appellant's specification, we find that pages 13 and 14 of the specification do convey with reasonable clarity to those skilled in the art, as of the filing date sought, that the inventor was in possession of the claimed limitation, "undesirable residual non-dielectric material," in claim 18.

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First as **Vas-Cath, Inc. v. Mahurkar** states, there is no requirement that the subject matter be described exactly. As such, the absence of the word, "undesirable," from Appellant's specification does not equate to a failure to meet the written description requirement. Second, page 13, line 29 through page 14, line 2 of the specification describe the formation of non-dielectric stringers or residue (701) which result from the removal process. These stringers are described as difficult to remove without damaging the structure of the protruding features. Page 14, lines 16 through 21 of the specification further describes how the stringers cause gate leakage. Both gate leakage and potential damage to the protruding features are unwanted or undesirable results and convey with reasonable clarity to one skilled in the art that the stringers are undesirable residual non-dielectric material left after removing non-dielectric material from the creases adjacent the protruding features. Thus, we find that the specification has support for the limitation, "undesirable non-dielectric material" found in claim 18, and that the written description requirement has been met.

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B. Rejection of claims under 35 U.S.C. § 103

After careful review, we sustain the Examiner's rejection of claims 12-23 as being unpatentable under 35 U.S.C. § 103.

At the outset, we note that Appellant has provided a statement, brief on page 3, line 14, that claims 13-17 stand or fall with independent claim 12 and claims 19-23 stand or fall with independent claim 18. Title 37 CFR § 1.192 (c)(7) (July 1, 1998) as amended at 62 Fed. Reg. 53196 (October 10, 1997), which was controlling at the time of Appellant's filing the brief, states:

For each ground of rejection which appellant contests and which applies to a group of two or more claims, the Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone unless a statement is included that the claims of the group do not stand or fall together and, in the argument under paragraph (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable. Merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable.

We will, therefore, consider claims 12-17 as standing or falling together as a group and claims 18-23 as standing or falling together as a group, and we will treat claims 12 and 18 as representative claims.

As pointed out by our reviewing court, we must first determine the scope of claims 12 and 18. "[T]he name of the game

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is the claim." **In re Hiniker Co.**, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998). Our reviewing court also states in **In re Zletz**, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) that "claims must be interpreted as broadly as their terms reasonably allow." Moreover, when interpreting a claim, words of the claim are generally given their ordinary and accustomed meaning, unless it appears from the specification or the file history that they were used differently by the inventor. **Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.**, 15 F.3d 1573, 1577, 27 USPQ2d 1836, 1840 (Fed. Cir. 1993). Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision. **In re Paulson**, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994).

Claim 12 recites the step of "removing a portion of the layer of non-dielectric material, leaving stringers of the non-dielectric material in the creases." Taking a reasonably broad interpretation, claim 12 requires the step of removing a portion of the layer of non-dielectric material and leaving stringers of non-dielectric material in the creases. In addition, when interpreting the particular word, stringers, in claim 12, the on-line Merriam-Webster's Collegiate Dictionary has defined a

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"stringer" as a "STRING" and defines "string" as a "LINE."

Appellant's specification also provides clarity to the definition of stringers as "a residue" of a polysilicon or amorphous silicon left after the removal process. See Appellant's Specification, page 13, line 22 through page 14, line 2. Finally, Appellant defines the "stringers" as a term of art for "small, undesirable residuals that are typically left in creases on a substrate after an etching process" on page 9, lines 3 through 4 of the Appeal Brief. However, Appellant has failed to provide any authority for this definition, and a search for the definition of stringers on speciality dictionaries did not produce any guidance. Thus, we find the definition of stringers to be a line-shaped residue of a polysilicon or amorphous silicon material after a removal process.

The scope of claim 18 differs from claim 12, reciting "leaving undesirable non-dielectric material in some of the creases" rather than "leaving stringers of non-dielectric material in the creases." As such, the scope and limitation of claim 18 will be treated separately. We next commence with a review of whether Kim discloses the limitations found in claim 12.

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The Examiner states that Kim discloses and teaches all the elements recited in claim 12. See Examiner's Answer, page 3, line 16 through page 4, line 2. To bolster this position, the Examiner asserts that removal of a portion of a non-dielectric material, such as silicon, which leaves an undesirable residue is known in the art. See Examiner's Answer, page 4, lines 3 and 5-9.

Appellant does not dispute that Kim has all the structure recited in claim 12, except for the limitations of "removing a portion of the layer of non-dielectric material, leaving stringer of the non-dielectric material in the creases; and (d) converting the stringers of non-dielectric material in the creases into a dielectric material" as recited in claim 12. Appellant's arguments focus on "spacers" and "stringers" being terms of the art that denote different structure. See Appeal Brief, page 9, lines 1-2. Specifically, Appellant contends that stringers are "small, undesirable residuals" and that spacers of Kim are "desirable features that are specifically designed and fabricated for various purposes by those of ordinary skill in the art." See Appeal Brief, page 9, lines 2-7.

We are not persuaded by Appellant's arguments and find that Kim discloses each element recited in the claim. Kim discloses

in column 1, lines 7-12 a method of manufacturing an integrated circuit. Kim states that this method includes the steps of forming features (including 12-14,17) on a substrate (11), the features protruding from the substrate to create creases adjacent the features. See Kim, column 2, lines 30-34 and 47 and associated figures 1A-C. Also, Kim discloses the step of depositing a layer of silicon material (18) over the features and creases. See Kim, column 2, lines 51-54 and 58-61 and associated figure 1B. The silicon material of the spacer is a non-dielectric material, which Appellant has not disputed.

Additionally, Kim discloses the step of removing a portion of the layer of non-dielectric material, leaving "stringers" of the non-dielectric material in the creases. See Kim, column 2, lines 58 through 61. Admittedly, Kim has used the word, "spacers" to describe what Appellant recites as "stringers." However, these resulting spacers (18) of Kim are a line-shaped residue of a non-dielectric material after an etching or removal process, just as the "stringers" of Appellant's invention are the polysilicon or silicon residue left after a removal process. Thus, we find that Kim does disclose the step of removing a portion of the layer of non-dielectric material, leaving stringers of the non-dielectric material in the creases.

We are not persuaded by Appellant's argument that stringers are different from spacers since the stringers are "small, undesirable residuals that are typically left in creases on a substrate after an etching process" and spacers "are desirable features that are specifically designed and fabricated for various purposes." See Appeal Brief, page 9, lines 1-7.

Stringers are described on page 13, line 29 through page 14, line 2 of Appellant's specification as a residue of polysilicon or amorphous silicon layer that results from the removal process. Similarly, column 2, lines 58-61 of Kim describes the spacers as a resulting formation or residue from an etching or removal process of a poly or amorphous silicon layer. Additionally, as stated on page 6, lines 16-20 of the Examiner's Answer, the distinction that stringers are "small" residuals as opposed to a spacer is not found as a limitation in the claims.

Lastly, Kim discloses the step of converting the stringers of non-dielectric material in the creases into a dielectric material. See Kim, column 2, lines 62-65, column 3, lines 2-6 and associated figure 1C. The conversion is the result of the oxidation step disclosed in Kim. Appellant also discloses on page 14, lines 9-12 of the specification that exposing the stringers to an oxidation or nitridization process converts the

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stringers to a dielectric or insulating material. As such, we find that the step of oxidizing the spacers of Kim is the same as converting the stringers of non-dielectric material in the creases into a dielectric material.

We note that the Examiner has stated that claim 12 is rejected under 35 U.S.C. § 103 as being unpatentable over Kim in view of Matsuoka. See Examiner's Answer, page 3, lines 14-15. The Examiner also states that Kim discloses and teaches all the elements recited in claim 12. See Examiner's Answer, page 3, line 16 through page 4, line 2. To bolster this position, the Examiner includes an alternative argument that one having ordinary skill in the art would have known to remove a portion of the non-dielectric material. We find that the statements addressing the alternative argument made by the Examiner are unnecessary since Kim discloses all the elements recited in claim 12. Furthermore, "anticipation is the epitome of obviousness."

In re McDaniel, 293 F.3d 1379, 1385, 63 USPQ2d 1462, 1466 (Fed. Cir. 2002) (quoting **Connell v. Sears Roebuck & Co.**, 722 F.2d 1542, 1548, 220 USPQ 193, 198 (Fed. Cir. 1983) (quoting **In re Fracalossi**, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982))).

As such, we hold that Kim discloses all elements recited in claim 12 and sustain the Examiner's rejection. Since Appellant

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states claims 13-17 stand or fall with respect to claim 12, we also sustain the rejection of claims 13-17.

We next treat claim 18, which stands or falls separately from claims 12-17. Claim 18 includes all the limitations found in claim 12, except for the step of "removing a portion of the non-dielectric material from the creases using a given method, the given method leaving undesirable residual non-dielectric material in some of the creases; and (d) converting the undesirable residual non-dielectric material in the creases into a dielectric material." As for the identical steps recited in claims 12 and 18, we find that Kim discloses those steps for the above stated reasons.

With specific regards to the removal step, we repeat that Kim discloses in column 2, lines 58-61 that the spacers are non-dielectric residue left in some of the creases after an etching or removal process. However, Appellant contends that the spacers are a desirable, not an undesirable, residue. See Appeal Brief, page 9, lines 4-6 and page 10, lines 3-6. Citing column 1, lines 9-12 and column 4, lines 1-8 of Kim, Appellant argues that the spacers are desirable since they assist in forming a self-aligning contact that has advantages over conventional contacts.

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Upon review of Kim, we disagree. While the spacers may have some advantages that make it desirable, the spacers also have other significant disadvantages that make them undesirable, namely that they are made from a non-dielectric or conducting material. A careful review of column 1, lines 9-12 and column 4, lines 1-8 of Kim states that the *thermal oxide* spacer and not the spacer itself is desirable. If the spacers are left exposed without the step of oxidizing or converting them to a dielectric material, they are undesirable. Thus, we find that the spacers are "undesirable residual non-dielectric material in some of the creases" after removing the non-dielectric material from the creases during an etching process.

Additionally as stated above, Kim discloses in column 1, lines 9-12, column 2, lines 62-65 and column 4, lines 1-8 that the spacers or undesirable residual non-dielectric material in the creases are converted to a dielectric material during an oxidation process.

Thus, we sustain the Examiner's rejection that Kim discloses and teaches all the elements recited in claim 18. Since claims 19-23 stand or fall with claim 18, we also sustain the Examiner's rejection of those claims.

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**Rejection of claims under a Non-statutory
Double Patenting Rejection**

The Examiner has rejected claims 12-23 under the judicially created doctrine of double patenting over claims 1-22 of U.S. Patent No. 5,872,052 (Iyer). See Examiner's Answer, page 4, line 17 through page 5, line 10. Appellant disagrees with the Examiner's rejection. See Appeal Brief, page 15, line 1. However, no arguments have been presented addressing why Appellant disagrees with the Examiner.

Section 1.192 of Title 37 of the Code of Federal Regulations states:

§ 1.192 Appellant's brief.

. . .
(c) The brief shall contain the following items under appropriate headings and in the order indicated below unless the brief is filed by an applicant who is not represented by a registered practitioner:

. . .
(8) Argument. The contentions of appellant with respect to each of the issues presented for review in paragraph (c)(6) of this section, and the basis therefor, with citations of the authorities, statutes, and parts of the record relied on. Each issue should be treated under a separate heading.

. . .
(v) For any rejection other than those referred to in paragraphs (c)(8)(I) to (iv) of this section, *the argument shall specify the errors in the rejection and the specific limitations in the rejected claims, if appropriate, or other reasons, which cause the rejection to be in error.* (emphasis added)

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As the rule states, Appellant is required for a double patenting rejection to specify the errors in the rejection and the reasons which cause the rejection to be in error. Upon reviewing, we fail to find that Appellant has specified the errors in the Examiner's double patenting rejection or reasons why the rejection is in error. Indeed, Appellant discusses his recognition that filing a Terminal Disclaimer would obviate this rejection. See Appeal Brief, page 15, lines 1-12. Thus, since no arguments are present, we find there is no issue before us to determine.

In conclusion, we reverse the Examiner's rejection of claims 18-23 under 35 U.S.C. § 112, first paragraph and affirm the rejection of claims 12-23 under 35 U.S.C. § 103 and the rejection of claims 12-23 under the judicially created doctrine of double patenting.

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